Kansas

2001 - 2002 AIR QUALITY REPORT

A Message from the Director of the Division of Environment

Dear Reader,

As Kansas begins a new decade and millennium, the Kansas Department of Health and Environment (KDHE) will continue to work with the citizens of the state to maintain clean air. The 2001 - 2002 Kansas Air Quality Report is one way that the department informs the citizens of Kansas, of not only the successes in air quality management, but also those areas that need improvement. KDHE will continue to rely on the support and cooperation of citizens, businesses, industry and federal, state, and local governments to address these areas of concern.

To maintain clean air across the state, it will take an active involvement by all Kansas citizens. Whether that means having your car tuned-up regularly, mowing your yard later in the evening during ozone alert days, or car-pooling to work, each person's contribution is essential. Although Kansas' overall air quality continues to be good, continued improvements will have to balance the needs of the environment with the needs of industry.

Everyone has a stake in keeping Kansas' air clean, and everyone can contribute to that continued success.

Ronald F. Hammerschmidt, Ph. D.
Director, Division of Environment

MISSION STATEMENT

The Bureau of Air and Radiation's mission is to protect the public from the harmful effects of radiation and air pollution and conserve the natural resources of the state by preventing damage to the environment from releases of radioactive materials or air contaminants.

Kathleen Sebelius, Governor

Roderick L. Bremby, Secretary

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Foreward

This 2001 - 2002 report is issued by the Kansas Department of Health and Environment, Bureau of Air and Radiation, to inform the citizens of Kansas of current air quality issues throughout the state. The air program in the state of Kansas is a coordinated effort of the Division of Environment and four local air pollution control authorities. The Bureau of Air and Radiation works closely with the local agencies to ensure that Kansas is meeting Federal Clean Air Act requirements in accordance with the Federal Environmental Protection Agency guidelines. The Bureau has been designated as the responsible agency to collect the statewide air quality monitoring data needed to determine the status of compliance with the National Ambient Air Quality Standards (NAAQS).

This report presents the results of measurements of pollutant levels in the ambient air, that portion of the atmosphere near ground level and external to buildings or other structures. Legal limitations on pollutant levels allowed to occur in the ambient air, or ambient air quality standards, have been established for six pollutants, each of which is discussed in more detail in this report. The six pollutants, referred to as criteria pollutants, are carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter. Under Section 108 of the Clean Air Act, the Administrator of the U.S. Environmental Protection Agency (EPA) has determined that these six pollutants may reasonably be anticipated to endanger public health and/or welfare and has issued criteria upon which the ambient standards for each have been established.

An essential component of air quality management in the state is the identification of (1) areas where the ambient air quality standards are being violated and plans are needed to reach attainment, and (2) areas where the ambient standards are being met, but plans are needed to ensure maintenance of acceptable levels of air quality in the face of anticipated population and industrial growth. The end result of this attainment/maintenance analysis process is the development of local and statewide strategies of stationary source permitting, enforcement, and transportation/air quality planning. This report presents the data that were EPA reportable in 2001.

This year’s report also includes a section on emission inventory issues and related data. The inventory is a summary of air pollutant emissions across the state during the preceeding year.

Inquiries concerning this document and data collection should be directed to:

Kansas Department of Health and Environment
Division of Environment
Bureau of Air and Radiation
1000 SW Jackson, Suite 310
Topeka, Kansas 66612-1366
(785) 296-1692

The Kansas Ambient Air Monitoring Network

The primary purposes of the KDHE air monitoring program are evaluating air pollution trends and measuring compliance with the National Ambient Air Quality Standards (NAAQS). Other purposes include determining effects on air quality from adjustments to source emissions, developing algorithms based on historical air quality and other conditions which will forecast air quality, verifying air quality modeling programs, and correlating health effects to air quality.

Sites designated by the United States Environmental Protection Agency (EPA) as National Air Monitoring Stations (NAMS) or State and Local Air Monitoring Stations (SLAMS) are included in the Kansas Ambient Air Monitoring Network. Data obtained at NAMS stations are used by EPA to determine national air pollution trends. Data collected at both NAMS and SLAMS are compared to National Ambient Air Quality Standards (NAAQS), and are used by the state of Kansas and EPA to determine attainment status for criteria pollutants.

The Kansas Ambient Air Monitoring Network generates a large quantity of data from monitoring instruments located across the state. Data obtained from this monitoring network are reported on a quarterly basis to the Air Quality System (AQS), a national database maintained by EPA.

Data collected within the network must be representative of the spatial area under study. The goal in siting a monitoring station is to match the spatial scale represented by the samples obtained with the spatial scale most appropriate for the monitoring objective of the station.

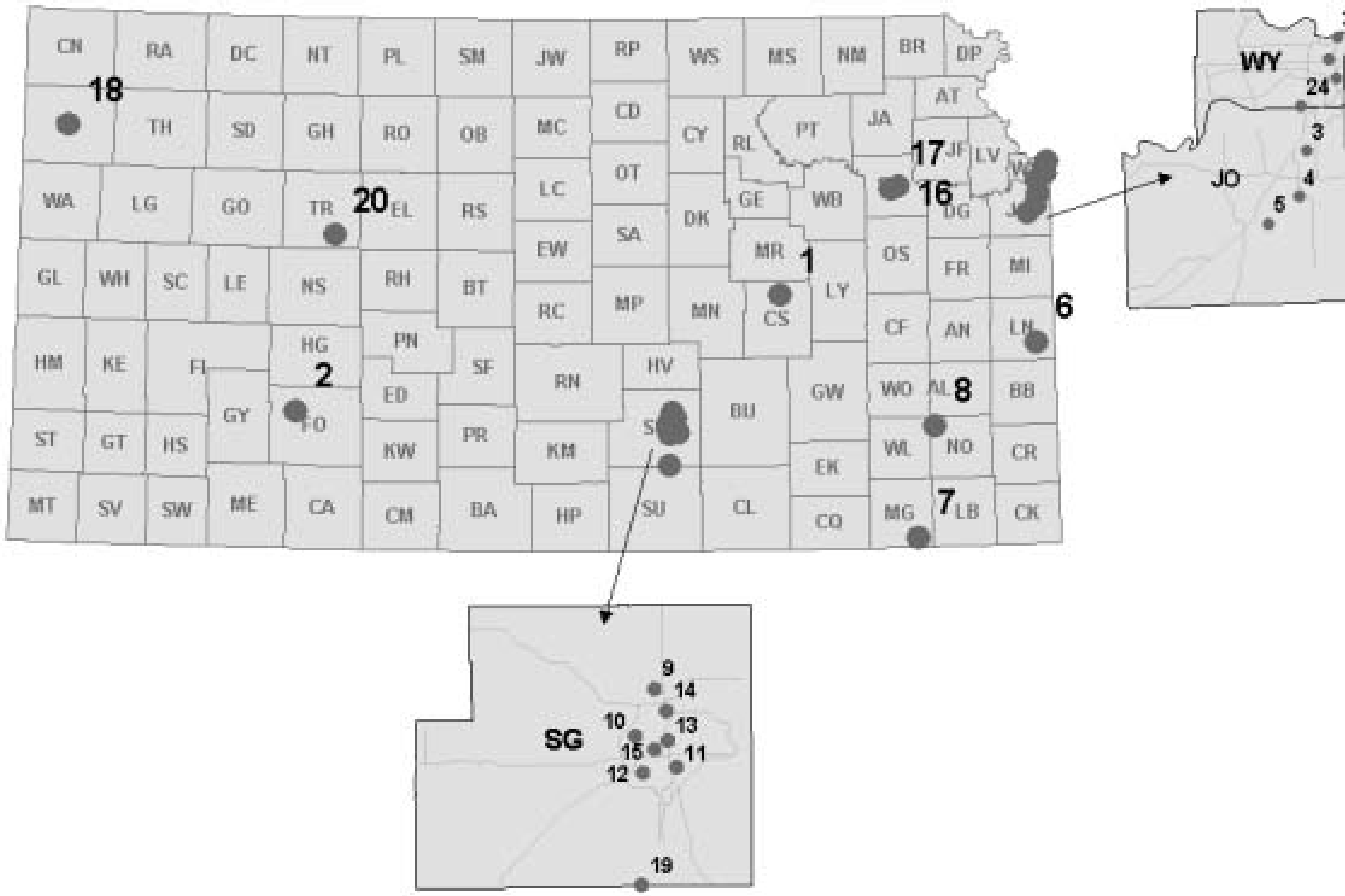
The Kansas Ambient Air Monitoring Network for 2001 consisted of 25 sampling sites at which the following criteria pollutants were measured (See map and table on pages 6 & 7):

- √ $PM_{2.5}$ at 13 sites
- √ PM_{10} at 12 sites
- √ Sulfur dioxide (SO_2) at 5 sites
- √ Ozone (O_3) at 6 sites
- √ Carbon monoxide (CO) at 5 sites
- √ Nitrogen dioxide (NO_2) at 3 sites

The composition of the Kansas Ambient Air Monitoring Network varies with changing federal and state requirements. A complete description of all long-term monitoring stations operated by KDHE is available from:

Kansas Department of Health and Environment
Division of Environment
Bureau of Air and Radiation
1000 SW Jackson, Suite 310
Topeka, KS 66612-1366

Air Quality Monitoring Sites in Kansas



Kansas Air Monitoring Network

ID	CITY/CO.	ADDRESS	AQS ID	TSP	PM_{10}	CPM_{10}	$PM_{2.5}$	$CPM_{2.5}$	Visibility	CO	SO_2	O_3	NO_x
1	Chase Co.	Tallgrass Prairie	017-0001						IMPROVE				
2	Dodge City	2100 First	057-0001		SPM								
3	Overland Park	85th & Antioch, Justice Center	091-0007				SLAMS						
4	Overland Park	Oxford Middle School	091-0008				SLAMS						
5	Olathe	BlackBob Elem. School	091-0009				SLAMS						
6	Linn Co.	Mine Creek Historic Site	107-0002				SLAMS	SPM		SPM	SPM	SPM	SPM
7	Coffeyville	Union & East North	125-0006			SPM					SPM + H_2S		
8	Chanute	1500 West Seventh	133-0002	SPM	SPM								
9	Park City	200 East 53rd North	173-0001									NAMS	
10	Wichita	13th & St. Paul	173-0007		SLAMS	SPM							
11	Wichita	G. Washington & Skinner	173-0008			SLAMS	SLAMS						
12	Wichita	Pawnee & Glenn	173-0009			SLAMS	SLAMS						
13	Wichita	1900 East Ninth, H.D.	173-0010			SPM	CORE			SLAMS		NAMS	SPM
14	Wichita	3600 N. Hydraulic	173-1012		Colo.	NAMS							
15	Wichita	Douglas & Main	173-1014							SLAMS			
16	Topeka	Robinson Middle School	177-0010		SPM		SLAMS						
17	Topeka	McClure Elem. School	177-0011				SLAMS						
18	Goodland	1010 Center	181-0001		SPM								
19	Peck	Peck Community Bldg.	191-0002				SLAMS			SPM	SPM	SPM	SPM
20	Trego Co.	Cedar Bluff Reservoir	195-0001					SPM	IMPROVE		SPM	SPM	
21	Kansas City	420 Kansas	209-0015		NAMS								
22	Kansas City	444 Kindelberger	209-0020		NAMS								
23	Kansas City	JFK Community Ctr.	209-0021				CORE + Speciation	SPM		SLAMS	NAMS	SLAMS	SPM
24	Kansas City	Midland Trail School	209-0022				SLAMS						

SPM: Special Purpose Monitor
SLAMS: State or Local Air Monitoring Station
IMPROVE: Interagency Monitoring of Protected Visual Environments
NAMS: National Air Monitoring Station
CPM : Continuous Particulate Matter

Standards and Monitoring Results

The Clean Air Act of 1970 required the United States Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) for each air pollutant anticipated to endanger public health or welfare. Pollutants in this category, termed criteria pollutants, included: total suspended particulate, lead, sulfur dioxide, carbon monoxide, ozone, and nitrogen dioxide.

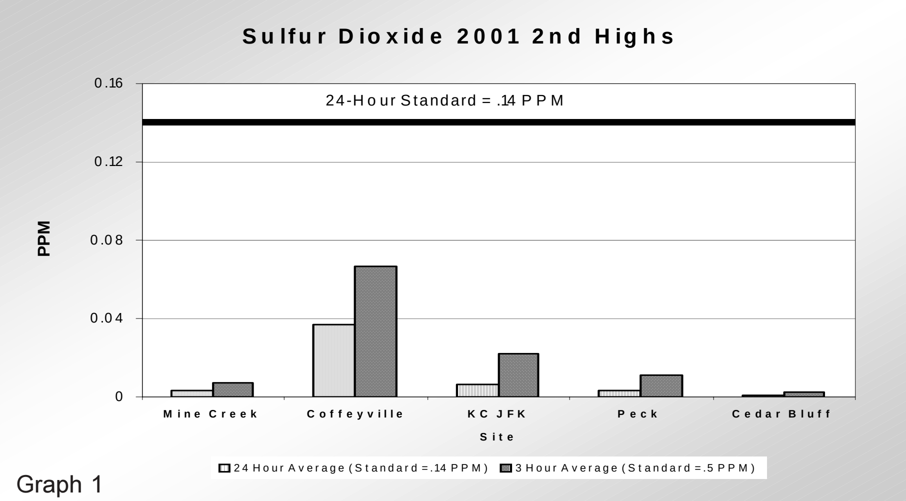
In 1987, total suspended particulate (TSP) was replaced by particulate matter less than 10 microns (1/100 of a millimeter) in diameter (PM_{10}). On July 18, 1997, both the ozone and particulate standards were revised by the EPA. In addition, a new standard for particulate matter with a diameter of less than 2.5 microns ($PM_{2.5}$) was introduced. However, the new standards were challenged in court. In May 1999, the U.S. Court of Appeals for the District of Columbia Circuit declared that the new standards were not enforceable. Therefore, the standards could not be implemented at that time. In February of 2001, the Supreme Court ruled in favor of EPA and remanded the case back to the D.C. Court of Appeals for a final decision. The Court of Appeals ruled in favor of EPA and the new standards are being implemented.

The current Air Quality Standards are summarized by pollutant in the table on page 9. As shown in the table, there are two types of air quality standards. The primary standard is designed to protect the public health with an adequate safety margin. Permissible levels were chosen to protect the health of the most susceptible individuals in a population, including children, the elderly, and those with chronic respiratory ailments. The secondary standard is designed to protect public welfare or ensure quality of life. Air quality conditions described by the secondary standard may be the same as the primary standard and are chosen to limit economic damage as well as harmful effects to buildings, plants, and animals.

During 2001, the Kansas Ambient Air Monitoring Program measured five of the six criteria air pollutants. Monitoring for the sixth, lead, was phased out during 1998, due in large part to the significant drop in measured values caused by the elimination of leaded gasoline.

Sulfur Dioxide

Sulfur dioxide (SO_2) belongs to the family of sulfur oxide gases. Sulfur is prevalent in raw materials such as crude oil, coal, and metal ores. Sulfur oxide gases are formed when fuel containing sulfur is burned; when gasoline is extracted from oil; and, when metals are extracted from ore. The majority of SO_2 released to the air comes from electric utilities, especially those that burn coal. Other sources that burn high sulfur fuel and release SO_2 to the air include petroleum refineries, cement manufacturing, metal processing facilities, locomotives, large ships, and some nonroad diesel equipment. SO_2 dissolves in water vapor to form acid, and interacts with other gases and particles in the air to form sulfates and other products that can be harmful to people and their environment.



Graph 1

National Ambient Air Quality Standards

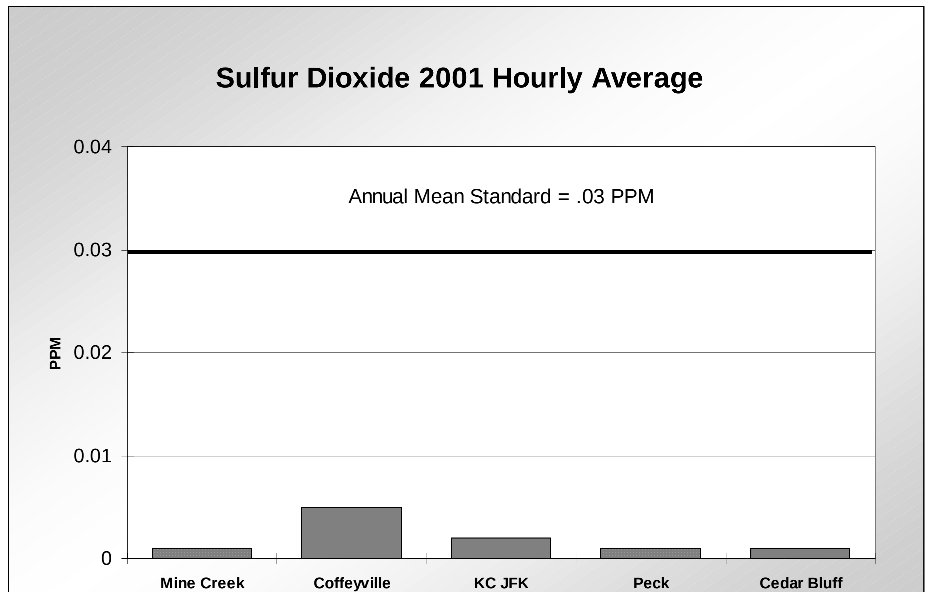
Criteria Air Pollutant	Averaging Time	Primary Standard	Secondary Standard
Carbon Monoxide (CO)	One-hour[a]	35 ppm[b] (40 mg/m^3 [c])	Same as Primary Standard
	Eight-hour[a]	9 ppm (10 mg/m^3)	None
Lead (Pb)	Quarterly Average	1.5 ug/m^3 [d]	Same as Primary Standard
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.053 ppm (100 ug/m^3)	Same as Primary Standard
Ozone (O_3)	One-hour Daily Maximum[e]	0.12 ppm (235 ug/m^3)	Same as Primary Standard
	Eight-hour Daily Maximum[f]	0.08 ppm (157 ug/m^3)	Same as Primary Standard
Particulate Matter (PM_{10})	Annual Arithmetic Mean[g]	50 ug/m^3	Same as Primary Standard
	24-hour Average[e]	150 ug/m^3	Same as Primary Standard
Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean[g]	15.0 ug/m^3	Same as Primary Standard
	24-hour Average[h]	65 ug/m^3	Same as Primary Standard
Sulfur Dioxide (SO_2)	24-hour[a]	0.14 ppm (365 ug/m^3)	None
	Annual Arithmetic Mean	0.03 ppm (80 ug/m^3)	None
	Three-hour[a]	None	0.50 ppm (1310 ug/m^3)

a Not to be exceeded more than once a year
b ppm = parts per million
c mg/m^3 = milligrams per cubic meter
d ug/m^3 = micrograms per cubic meter
f Established for a three-year average of the fourth highest daily maximum concentration
g Established for a three-year average
h Established for a three-year average of the 98th percentile of data

SO_2 contributes to respiratory illness, particularly in children and the elderly, and aggravates existing heart and lung diseases. People with asthma are particularly affected by peak levels of SO_2. It also contributes to the formation of acid rain, which damages trees, crops, historic buildings, and monuments, and makes soils, lakes, and streams acidic. SO_2 and sulfate particles can be transported over long distances and deposited far from the point of origin. This means that problems with SO_2 are not confined to areas where it is emitted. SO_2 also contributes to the formation of atmospheric particles that cause visibility impairment.

Results:

The primary air quality standard for SO_2 is expressed in three forms: an hourly average value; a 3-hour value not to be exceeded more than once per year; and a 24-hour value not to be exceeded more than once per year. Graph number 1 on page 8 shows the 2nd highest 3-hour and 24-hour average results for the four sites. Graph number 2 shows the hourly average value concentrations for the four sites where SO_2 was monitored in Kansas during 2001. All five sites were well below the hourly, 3-hour, and 24-hour standards for SO_2. The Coffeyville site shows the highest concentration for all forms of the standard due to the proximity of the site to industrial sources of SO_2.



Graph 2

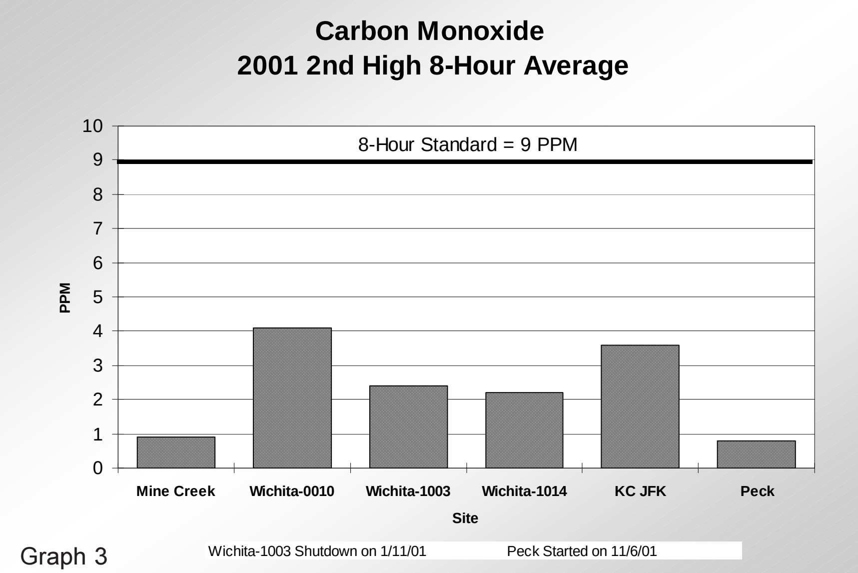
Carbon Monoxide

Carbon monoxide (CO), is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes about 56 percent of all CO emissions nationwide. Higher levels of CO generally occur in areas with heavy traffic congestion. Other sources of CO emissions include industrial processes (such as metals processing and chemical manufacturing), residential wood burning, and natural sources such as forest fires. The highest levels of CO in outside air typically occur during the colder months of the year when inversion conditions are more frequent. The air pollution becomes trapped near the ground beneath a layer of warm air.

Carbon monoxide can cause harmful health effects by reducing oxygen delivery to the body's organs (like the heart and brain) and tissues. The health threat from lower levels of CO is most serious for those who suffer from heart disease such as angina, clogged arteries, or congestive heart failure. For such a person, a single exposure to CO at low levels may cause chest pain and reduce that person's ability to exercise; repeated exposures may contribute to other cardiovascular effects. Even healthy people can be affected by high levels of CO. People who breathe high levels of CO can develop vision problems, reduced manual dexterity, and difficulty performing complex tasks. CO also contributes to the formation of smog, which can trigger serious respiratory problems.

Results:

The primary air quality standard for CO is expressed in two forms: an 8-hour average value; and a 1-hour average value. Both are not to be exceeded more than once per year. Graph number 3 shows the 2nd highest 8-hour average concentrations for the six sites where CO was monitored in Kansas during 2001. All six sites were well below the 8-hour standard. The one hour monitoring resuls ranged from 5% to 20% of the standard. A graph for these results is not included in this report.



Graph 3

Nitrogen Oxides

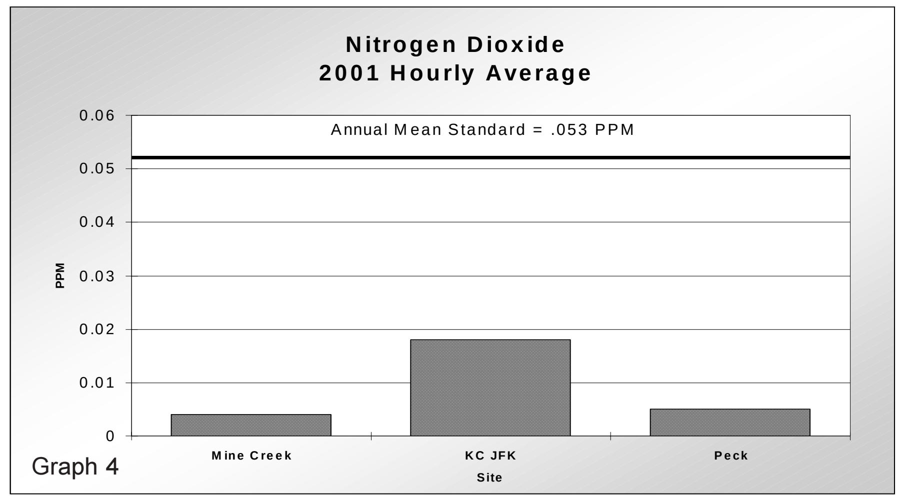
Nitrogen oxides (NO_x), is the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. Many of the nitrogen oxides are colorless and odorless. However, one common pollutant, nitrogen dioxide (NO_2) along with particles in the air can often be seen as a reddish-brown layer over many urban areas. Nitrogen oxides form when fuel is burned at high temperatures, as in a combustion process. The primary sources of NO_x are motor vehicles, boilers, furnaces, and other industrial, commercial, and residential sources that burn fuels.

NO_x is one of the main ingredients involved in the formation of ground-level ozone, which can trigger serious respiratory problems. It reacts to form nitrate particles, acid aerosols, as well as NO_2, which also cause respiratory problems. NO_x and the pollutants formed from NO_x can be transported over long distances, following the pattern of prevailing winds in the U.S. This means that problems associated with NO_x are not confined to areas where it is emitted. Controlling NO_x is often most effective if done from a regional perspective, rather than focusing on sources in one local area.

NO_x and sulfur dioxide react with other substances in the air to form acids which fall to earth as rain, fog, snow or dry particles. Acid rain causes deterioration of cars, buildings and historical monuments, and causes lakes and streams to become acidic and unsuitable for many species of fish. NO_x reactions can also cause the formation of small particles that penetrate deeply into sensitive parts of the lungs and can cause or worsen respiratory disease such as emphysema and bronchitis, and aggravate existing heart disease. Nitrate particles and nitrogen dioxide can block the transmission of light, reducing visibility in urban areas and on a regional scale in our national parks.

Results:

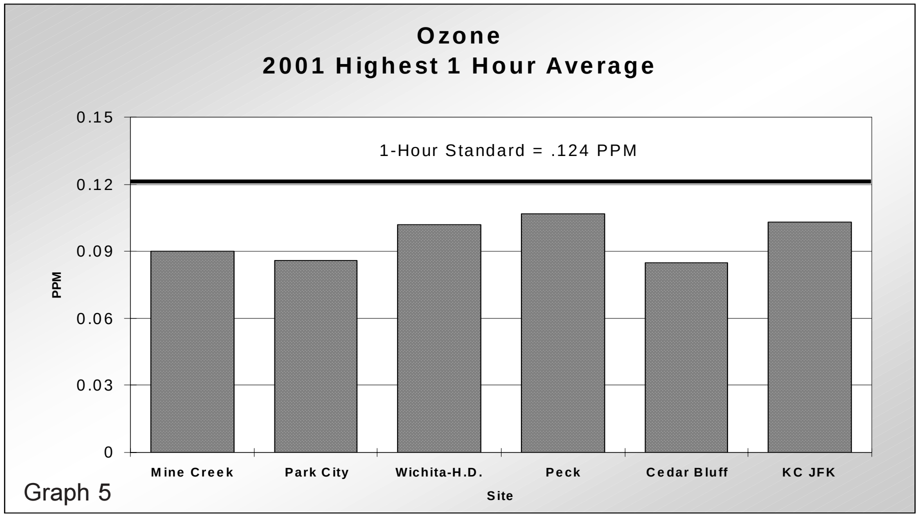
The primary air quality standard for NO_2 is expressed in the form of an annual arithmetic mean. Graph number 4 shows the monitoring results for the three sites where NO_2 was monitored during 2001. All sites were well below the primary air quality standard of 0.053 ppm. The annual average concentration recorded at the Kansas City monitoring site was higher than the Mine Creek and Peck site due to its location in a metropolitan area.



Graph 4

Ozone

Ozone (O_3) is a gaseous compund composed of three oxygen atoms. It is created by a chemical reaction between oxides of



Graph 5

nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of heat and sunlight. Ozone has the same chemical structure whether it occurs miles above the earth or at ground level. "Good" ozone occurs naturally in the stratosphere approximately 10 to 30 miles above the earth's surface and forms a layer that protects life on earth from the sun's harmful ultraviolet rays. In the earth's lower atmosphere, ground-level ozone causes health and environmental problems and is considered "bad."

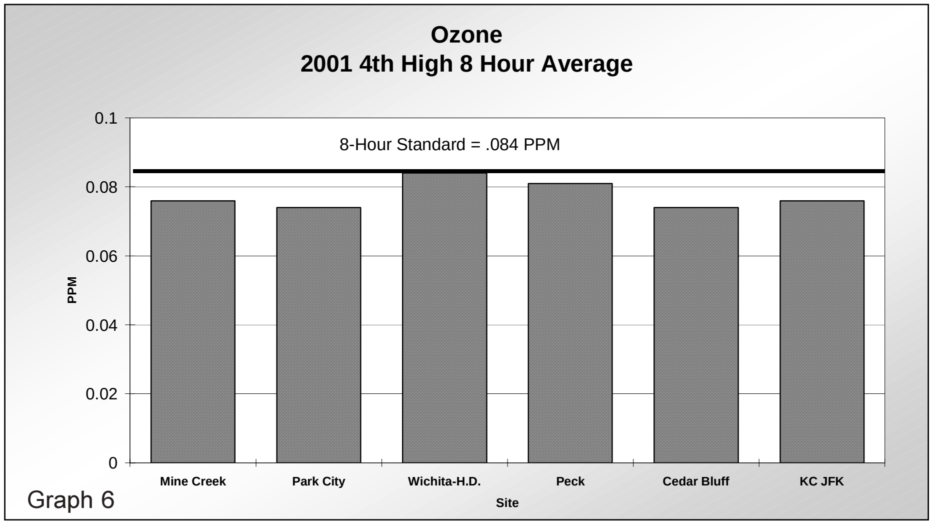
Motor vehicle exhaust, industrial emissions, gasoline vapors, and chemical solvents are some of the major sources of NO_x and VOC emissions that help to form ozone. Peak ozone levels typically occur during hot, stagnant summertime conditions. Many urban areas tend to have high ozone levels, but even rural areas are also subject to increased ozone levels because wind carries ozone and pollutants that form it hundreds of miles away from their original sources.

Ozone triggers a variety of health problems even at very low levels. It can cause permanent lung damage after long-term exposure. Ozone can irritate lung airways and cause inflammation. Other symptoms include wheezing, coughing, pain when taking a deep breath, and breathing difficulties during exercise or outdoor activities. People with respiratory problems are most vulnerable. Even at low levels, ground-level ozone triggers a variety of health problems including aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like pneumonia and bronchitis.

Ground-level ozone also damages the leaves of trees and other plants, ruining the appearance of cities, national parks, and recreation areas. Ozone reduces crop and forest yields and increases plant vulnerability to disease, pests, and harsh weather.

Results:

The primary air quality standards for ozone are concentrations over either 8-hour or 1-hour durations. The 8-hour standard is expressed in the form of the three-year average of each year's 4th highest concentration. The 8-hour standard is 0.08 ppm. The



Graph 6

standard is not exceeded until monitored values exceed 0.084 ppm, allowing for upward rounding. The 1-hour standard is not to be exceeded more than once per year on average over three years. The 1-hour standard is 0.12 ppm. The standard is not exceeded until monitored values exceed 0.124 ppm, allowing for upward rounding.

When evaluating ozone monitoring results, it is important to consider two points. First, monitoring results are rounded so a value can be slightly above the standard and not be considered a violation. Second, ozone values higher than the standard for one year do not always indicate a violation of the primary air quality standard. These determinations are made on the basis of three years of data.

Graph number 5 (p.13) shows the highest 1-hour concentrations for the six sites where ozone was monitored in Kansas during 2001. All of the monitoring sites had 1-hour results that were below the standard. Graph number 6 (p.13) shows the 4th highest 8-hour average concentrations for the same six sites. The 8-hour results show that all of the monitors are fairly close to or equal to the standard. Some of the ozone monitoring results will be discussed in greater detail in the sections of this publication dedicated to the Kansas City and Wichita metropolitan areas.

Particulate Matter (PM)

Particulate matter (PM) is the term for particles found in the air, including dust, dirt, soot, smoke, and liquid droplets. Some particles are directly emitted into the air from sources such as vehicles, factories, construction sites, tilled fields, unpaved roads, stone crushing, and burning of wood. Other particles may be formed in the air when gases from burning fuels react with sunlight and water vapor. Examples of such formation include fuel combustion in motor vehicles, at power plants, and in other industrial processes. Particles can be suspended in the air for long periods of time. Some particles are large or dark enough to be seen as soot or smoke. Others are so small that they can only be detected with an electron microscope.

Particulate Matter causes a wide variety of health and environmental impacts. PM is associated with serious health effects including: aggravated asthma; increases in respiratory symptoms like coughing and difficult or painful breathing; chronic bronchitis; decreased lung function and premature death. Elevated PM concentrations result in increased hospital admissions and emergency room visits for people with heart and lung disease. Health problems for sensitive people can get worse if they are exposed to high levels of PM for several days in a row.

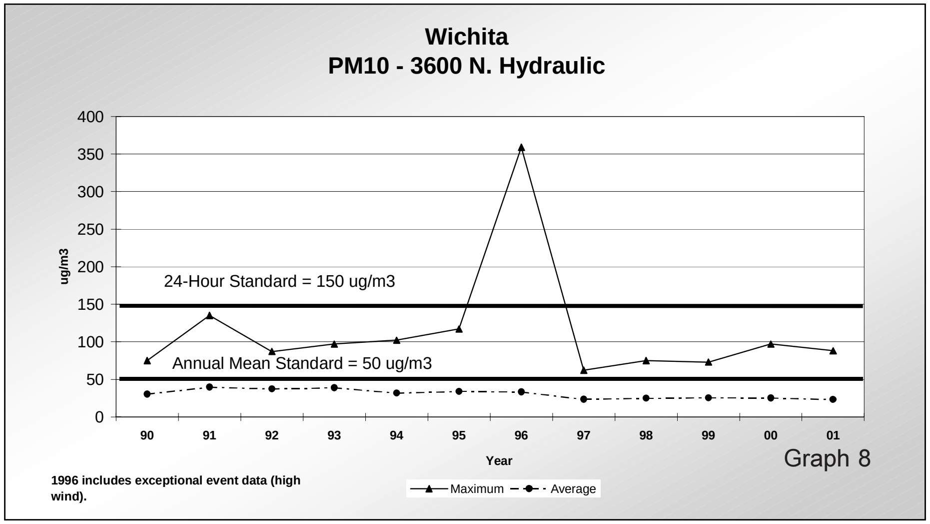
Fine particles can be carried over long distances by wind and then settle on ground or water. The effects of this settling include: making lakes and streams acidic; depleting the nutrients in soil; damaging sensitive forests and farm crops; and, affecting the diversity of ecosystems. It also causes erosion and staining of structures. Soot, a type of PM, stains and damages stone and other materials, including culturally important objects such as monuments and statues. Particulate matter is the major source of haze that reduces visibility in many parts of the United States, including our National Parks.

PM_{10}

Particulate matter with an aerodynamic diameter of less than or equal to 10 microns is designated as PM_{10}. Burning of wood, diesel and other fuels, and open burning contribute particulate matter to the atmosphere, generally in the form of smoke. Certain industrial processes also generate PM_{10}. In addition, dust from agricultural operations, unpaved roads, and dust storms contains a significant proportion of PM_{10}. Some areas within the state of Kansas experience occasional severe episodes of blowing dust or dust storms.

Inhalation of PM_{10} can cause irritation of the nose and throat, bronchitis, and damage to lung tissue. Children, elderly persons, and individuals with impaired lung or heart function are especially susceptible to the adverse health effects associated with inhalation of airborne particulate matter.

Particulate matter suspended in the atmosphere also reduces visibility. Particulate matter can be transported great distances in the atmosphere. The smaller the particle, the greater the potential for aerial transport. During the "Dust Bowl Days" of the 1930s, dust clouds originating in Kansas and neighboring states were observed on the East Coast of the United States. During the first calendar quarter of 1996, high winds coupled with extremely dry soil conditions caused exceedances of the air quality standard for PM_{10} in Morton and Sedgwick counties.

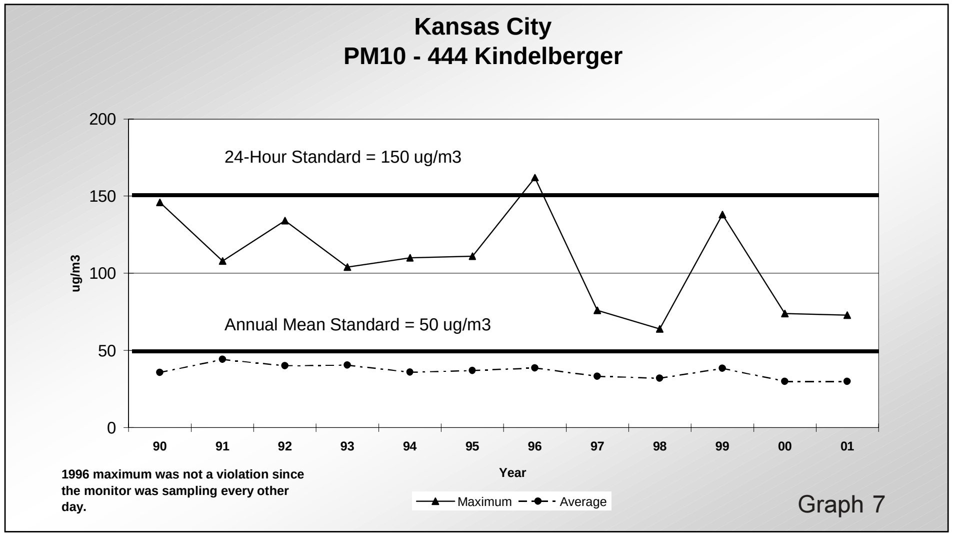


Graph 8

Results:

Graph number 7 shows the 12-year trend for PM_{10} at 444 Kindelberger in Kansas City. The annual average values have been stable over the twelve-year period at this site. These values are also well below the annual standard. The year 1996 also shows an increase in PM values but they are not as pronounced as the values recorded at the Wichita site. Wind values were not as strong in the Kansas City area.

Graph number 8 above shows the 12-year trend for PM_{10} monitored at the PM site at 3600 N. Hydraulic in Wichita. The annual average values have also been stable over the twelve-year period and well below the annual standard of 50 ug/m^3. The year 1996 shows a high 24-hour PM_{10} value due to extremely dry weather and high winds noted above.



Graph 7

$PM_{2.5}$

In 1997, EPA added a new particulate matter standard for particles with an aerodynamic diameter of less than or equal to 2.5 microns ($PM_{2.5}$). This change was based on concerns that smaller particles travel deep into the lungs and cause or aggravate respiratory problems such as asthma and chronic bronchitis. Children, the elderly, and people with lung or heart disease are considered to be especially susceptible to the adverse health effects of airborne fine particulate matter.

Fine particles ($PM_{2.5}$) result from fuel combustion in motor vehicles, power generation, and industrial facilities, as well as from residential fireplaces and wood stoves. Research has shown that gases such as sulfur oxide and SO_2, NO_X, and VOC interact with other compounds in the air to form fine particles.

Results:

The $PM_{2.5}$ standards issued by EPA in 1997 were set for two time periods, an annual average and a 24-hour average. The annual average standard was set at 15.0 micrograms per cubic meter ($\mu g/m^3$), while the 24-hour average standard was set at 65 $\mu g/m^3$. The $PM_{2.5}$ monitoring sites across the state have completed 3 years of data gathering. This 3 year period began in January of 1999. All sites across the state have remained within the $PM_{2.5}$ standards over this 3 year period. The table on page 17 lists the values of PM_{10} and $PM_{2.5}$ that were recorded across the state in 2001.

Particulate Matter Data - 2001

SITE	PM_{10} MAXIMUM (STD=150ug/m^3)	PM_{10} AVERAGE (STD=50ug/m^3)	$PM_{2.5}$ 98TH PERCENTILE (STD=65ug/m^3)	$PM_{2.5}$ AVERAGE (STD=15.0ug/m^3)	SITE	PM_{10} MAXIMUM (STD=150ug/m^3)	PM_{10} AVERAGE (STD=50ug/m^3)	$PM_{2.5}$ 98TH PERCENTILE (STD=65ug/m^3)	$PM_{2.5}$ AVERAGE (STD=15.0ug/m^3)
KANSAS CITY, KS / JOHNSON COUNTY					**WICHITA**				
420 KANSAS	66	33	NA	NA	13TH AND ST PAUL	53	22	NA	NA
Kindelberger	73	30	NA	NA	G. WASHINGTON & SKINNER	75	23	25.2	11.6
JFK COMM. CENTER	NA	NA	30.5	13.6	PAWNEE & GLENN	70	22	25.2	11.2
MIDLAND TRAIL ELEM.	NA	NA	24.6	11.5	HEALTH DEPARTMENT	79	27	24.8	11.2
OVERLAND PARK JUSTICE CENTER	NA	NA	27.3	12.2	3600 N HYDRAULIC	88	23	NA	NA
OXFORD MIDDLE SCHOOL	NA	NA	26.1	11.8	PECK (SUMNER CO.)	NA	NA	21.6	10.6
BLACK BOB ELEM. SCHOOL	NA	NA	25.4	11.9					
TOPEKA					**OTHER SITES**				
ROBINSON MIDDLE SCHOOL	45	21	22.8	10.7	DODGE CITY	55	20	NA	NA
WASHBURN UNIVERSITY*	25	14	23.5	13.1	COFFEYVILLE	53	18	NA	NA
MCCLURE ELEM SCHOOL	NA	NA	22.5	10.4	CHANUTE	63	23	NA	NA
					GOODLAND	52	23	NA	NA
					MINE CREEK (LINN CO.)	NA	NA	23.3	10.4

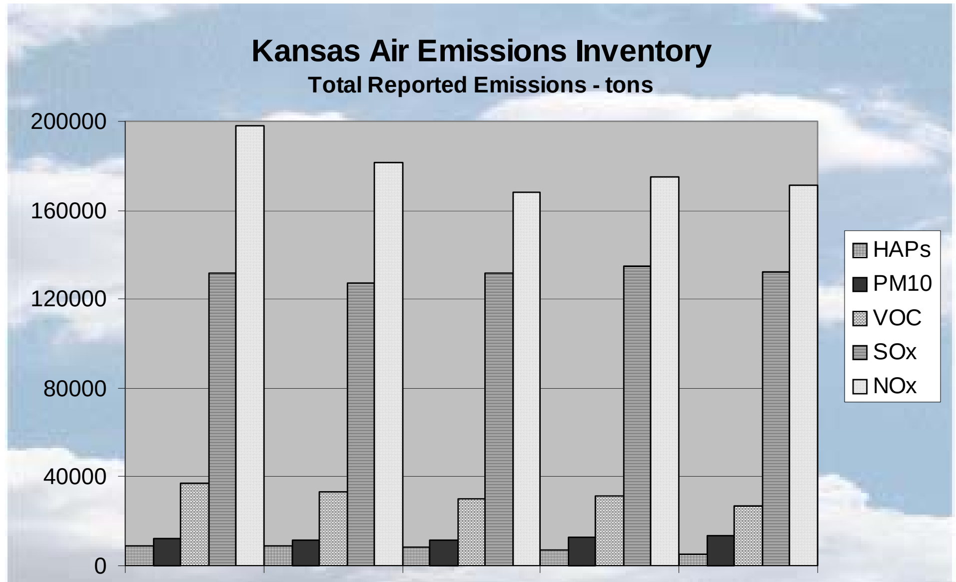
* Washburn site was shutdown on 3/30/01.

Emissions Inventory

An emissions inventory is a summary of air pollutant emissions covering a geographic area for a specific time period. Emissions inventories have multiple uses on both the federal and state levels. Examples of how the Bureau of Air and Radiation uses emissions inventory information are listed below:

- To determine trends in air pollutant emissions levels,
- To provide inputs to air quality modeling,
- To design air pollution control policies and assess their effectiveness after they have been implemented,
- To site ambient air monitors, and
- To determine emissions fees.

A comprehensive emissions inventory includes emissions from point, area, mobile and natural sources. **Point sources** are large, stationary sources of emissions. In Kansas, point sources are defined as facilities that meet certain emissions thresholds and are required to obtain a Class I or Class II operating permit. Examples of point sources are natural gas compressor stations, petroleum refineries and grain processing or storage facilities. **Area sources** are smaller, generally more numerous sources whose individual emissions do not qualify them as point sources and, therefore, are not subject to permitting requirements. Although area sources release relatively small amounts of air pollutants on an individual basis, because of the numbers of these sources, their emissions as a whole can be significant. Examples include vehicle refueling, residential fuel combustion and household products such as solvents and paints. **Mobile sources**, which are sources of air pollution that are not stationary, are divided into two categories: *onroad*, which includes cars, trucks, buses and motorcycles, and *offroad*, which includes lawnmowers, locomotives and tractors. Finally, **biogenic and geogenic** emissions are those resulting from



Graph 9

natural sources, such as forests, agricultural crops and soil erosion.

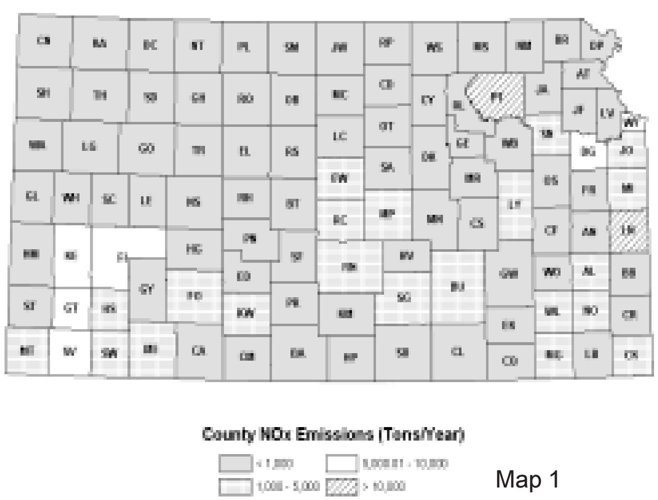
Point Source Emissions Inventory and Fee Program

Every year the Bureau of Air and Radiation prepares an emissions inventory of SO_2, CO, NO_2, VOC, PM_{10} and hazardous air pollutants from point sources. In February, the Bureau mails survey forms to facilities with Class I and Class II permits. The forms request information regarding operating rates and the quantities and types of air pollutants emitted during the preceding calendar year. Facilities must complete the forms and submit them to the Bureau by June 1. The Bureau enters the information from the forms into a large database, reviews the data for quality assurance purposes, and forwards the completed emissions inventory to the Environmental Protection Agency (EPA).

The Bureau has completed the 2000 Emissions Inventory, which summarizes the results of the Kansas point source emissions survey for calendar year 2000. Graph 9, on page 18, illustrates the total reported emissions in tons from 1996 through 2000. Maps 1 and 2 show total point source emissions of NO_x and VOCs, which are the pollutants that lead to ground-level ozone formation.

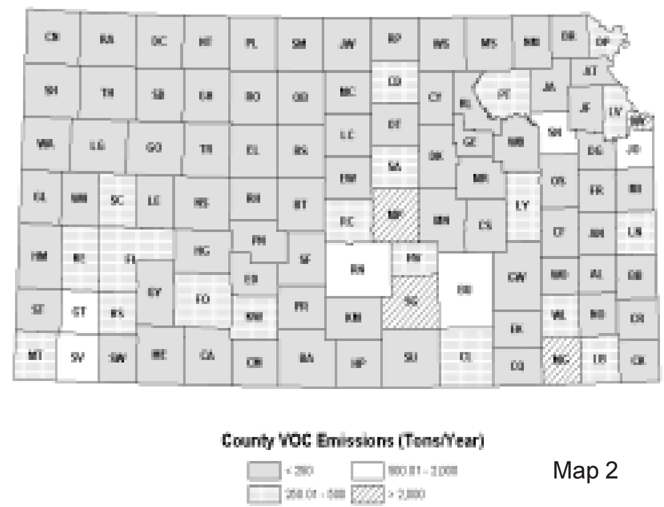
In conjunction with the annual emissions inventory, the Bureau collects emissions fees from point sources with Class I operating permits to help support air program activities and provide services to the public and regulated community. Since the fee fund's inception in 1993 with an initial rate of eighteen dollars per ton, the fee has ranged from a high of twenty dollars per ton in 1994 to a low of thirteen dollars per ton from 1997 through 2000. The fee for calendar year 2001 emissions is twenty dollars per ton.

2000 NOx Emissions from Class I and Class II Facilities



Map 1

2000 VOC Emissions from Class I and Class II Facilities



Map 2

Area and Mobile Source Emissions Inventories

The Bureau of Air and Radiation has traditionally developed the point source portion of the emissions inventory and relied upon EPA to complete the area and mobile source components. Every three years, the EPA generates estimates of area and mobile source emissions for the state of Kansas and combines the information with the point source emissions inventory submitted by the Bureau. The EPA then merges the complete Kansas inventory with data for other states to create a national emissions inventory. Figures 1 and 2, on page 20, present the results for Kansas area and mobile sources from the 1999 National Emissions Inventory. The figures illustrate the area and mobile source categories that are the most significant contributors to

VOC Emissions from Area and Mobile Sources in Kansas

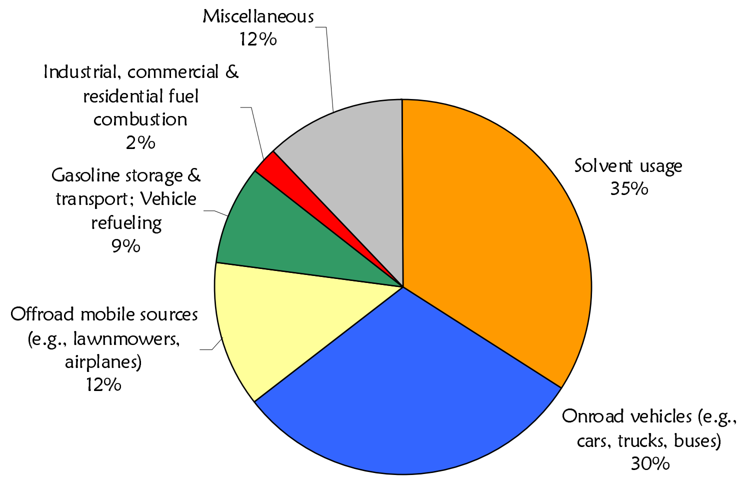
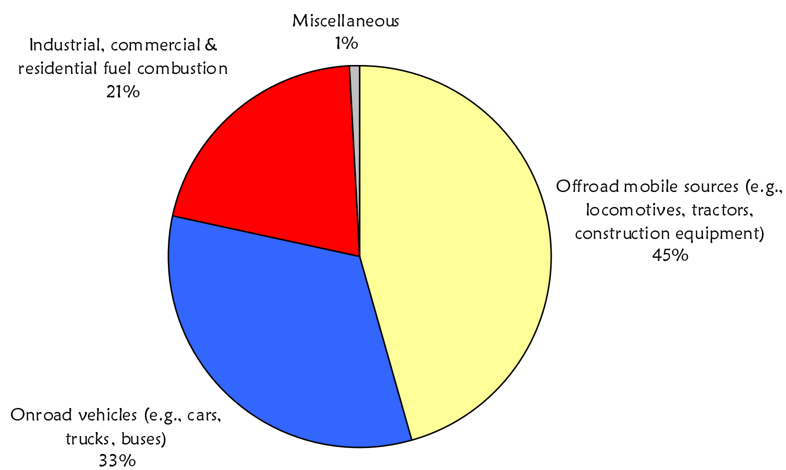


Figure 1

Source: U.S. Environmental Protection Agency, 1999 National Emission Trends database, AIRData Website, http://www.epa.gov/air/data/

NOx Emissions from Area and Mobile Sources in Kansas



Source: U.S. Environmental Protection Agency, 1999 National Emission Trends database, AIRData Website, http://www.epa.gov/air/data/

Figure 2

VOC and NOx emissions in Kansas.

The Bureau is increasingly taking a more active role in reviewing the data prepared by EPA and developing our own data for categories where local knowledge provides more accurate estimates of emissions. For example, the Bureau has recently developed emissions estimates for wildfires, pesticide usage and oil and gas production.

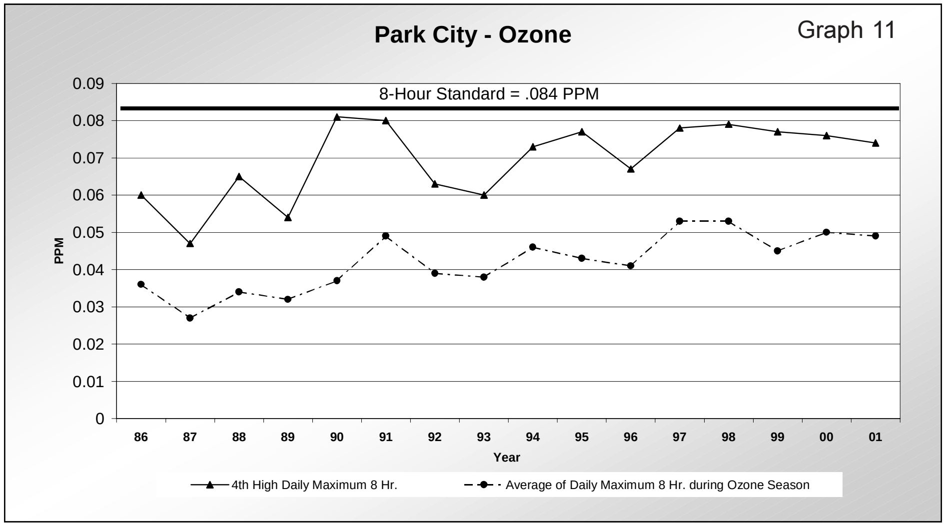
Wichita Ozone

The Wichita-Sedgwick County area has been experiencing a moderate increase in monitored levels of ozone over the past decade. While the levels rarely approach the 1-hour ozone standard of 120 parts per billion, the monitoring results are cause for concern when compared to the new 8-hour ozone standard of 80 parts per billion. Graph 10, on page 21, shows the ambient ozone monitoring trends for the monitoring site located at the Department of Environmental Health. Additional monitoring sites are located south of Wichita at Peck and north at Park City (Graph 11, Page 21).

The graphs show the ozone values expressed in the form of the standard used to determine an exceedance, as well as the average of the daily maximums during the ozone season. The first set of values are important in evaluating how the area is doing in regard to attainment of the National Ambient Air Quality Standard. The latter values are indicators of how severe the ozone season was in a given year. The 8-hour values for the Wichita Department of Environmental Health monitor for the last three years show how close Wichita is to exceeding the 8-hour standard.

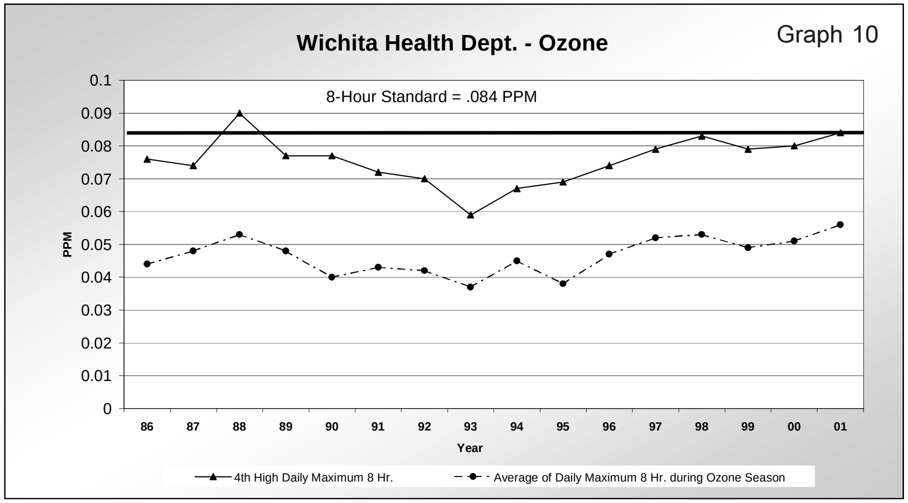
When EPA issued the 8-hour standard in July of 1997, local officials in Wichita-Sedgwick County recognized the need to take a proactive stance and agreed to participate in an EPA program known as the Voluntary Ozone Reduction Consortium. The goal of the program is for cities with ozone values close to the 8-hour standard to develop voluntary ozone reduction strategies. Successful implementation of the strategies would result in fewer cities such as Wichita exceeding the standard in the future. The public health, social and economic impacts of an ozone nonattainment designation for a city like Wichita would be severe. Such a designation would require development of a State Implementation Plan or SIP. The SIP would address issues such as: regulations to provide for emission reductions from point sources; mobile source emission reductions; improving the emissions inventory of all air pollution sources; and, ensuring that the local transportation plan does not include projects that would jeopardize the area coming into compliance with the air quality standard.

In 1999, local officials formed a work group of individuals



Graph 11

representing industry, government, education and the public to address the ozone problem. Much of the first year was spent educating group participants about ozone formation, monitoring results, emissions inventories, and potential ozone reduction strategies. In 2000, a report recommending ozone education and control strategies was prepared for submission to the governing body. In 2001 a contractor was selected to conduct an emissions inventory for area and mobile sources to better understand the sources of ozone precursors in the county and to develop a baseline against which reductions can be measured. The inventory was completed in 2002, and the focus of the work group has moved to developing a public education plan for the 2003 ozone season. The public education activities will attempt to inform citizens about the health effects of exposure to ozone, the role that individuals' daily activities play in ozone formation and actions they can take, such as car pooling, to reduce emissions of ozone precursors.



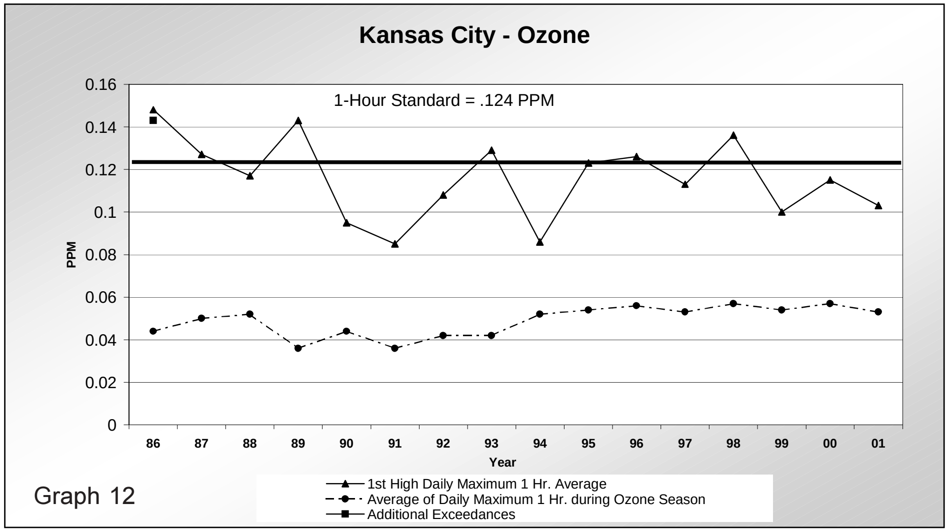
Graph 10

Kansas City Ozone

Based on air quality monitoring data collected by the States of Kansas and Missouri, the Kansas City area was determined to be in violation of the national 1-hour ozone air quality standard in the 1970s. The federal Clean Air Act requires that if any area fails to attain the standard for any criteria pollutant, the respective state must develop and implement a State Implementation Plan (SIP). As a result of the violation, the State of Kansas developed and implemented an ozone SIP for the Kansas side of the Kansas City area, which includes the counties of Johnson and Wyandotte. The State of Missouri developed a SIP for three Kansas City area counties on the Missouri side of the state line. Together, the two SIPs represented the strategies that would be employed to bring the area into compliance with the ozone standard. EPA approved the 1979 Kansas SIP, which projected that Kansas City would meet the ozone standard by December 31, 1982.

In calendar years 1983 and 1984, however, the ambient air monitor data for the region revealed that violations of the ozone standard had again occurred. These violations required the states to make revisions to the 1979 SIPs. Accordingly, the Kansas SIP was revised to include additional control measures for the region. With further reductions of volatile organic compound (VOC) emissions in the area, the new SIP projected the area would be in attainment of the ozone NAAQS by December 31, 1987. In November 1989, the SIP was fully approved by the EPA. Efforts to redesignate the Kansas City area to attainment were halted when several exceedences of the ozone standard were monitored during the summer of 1988. Graph number 12, on page 23, shows 1-hour ozone monitoring results for the years 1986 through 2001.

By the end of 1991, Kansas and Missouri had sufficient monitoring data showing results below the ozone standard to

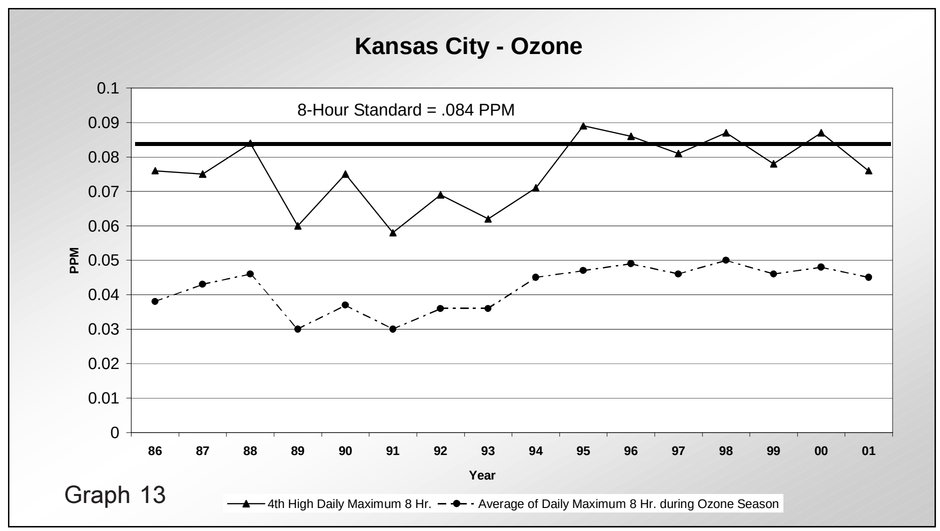


Graph 12

demonstrate that the area had attained the ozone standard. Both states revised their respective SIPs for Kansas City to reflect that the area had achieved the ozone standard. A Maintenance Plan, which the EPA approved on June 23,1992, contained documentation that supported the redesignation of the area to attainment and provided for contingency measures if violations of the ozone standard occurred in the future. In the summer of 1995, a long hot spell resulted in the Liberty, Missouri monitor recording a violation of the ozone standard for the three-year period from 1993 to 1995. The violation required the two States to implement measures to bring the area back into compliance with the ozone standard.

To address the short-term need to control emissions, Kansas promulgated a rule to limit the Reid Vapor Pressure (RVP) of the gasoline sold during the summer months in the Kansas City area to 7.2 pounds per square inch (psi). This regulation became effective May 2, 1997. To address the longer term need to reduce VOC and nitrogen oxide emissions, the Mid-America Regional Council's Air Quality Forum, comprised of representatives from local governments, business, health, and environmental organizations, examined various control strategies and developed a slate of recommended emission reduction measures. Two new rules resulted from this process. The two states adopted rules requiring 7.0 RVP gasoline in summer months and the use of low vapor pressure solvent for cold metal cleaning operations.

In July of 1997, EPA developed a more stringent 8-hour ozone national standard. The standard was challenged in federal court which delayed implementation for several years. The first step in the process of implementing the new 8-hour standard is the designation of attainment status for the Kansas City area. The attainment status will be determined based on monitoring results for the three-year period from 2000 to 2002. Graph number 13 shows 8-hour ozone monitoring results for the years 1986 through 2001. Based on preliminary monitoring results for the summer of 2002 and the quality assured data for the previous two years, the Kansas City area will be in violation of the new standard. The State of Kansas will submit a recommendation to EPA regarding which Kansas counties should be included in the area to be designated as nonattainment. KDHE staff are currently gathering and reviewing technical information to be incorporated into the designation package for EPA.



Graph 13

About the Bureau

The mission of KDHE's Bureau of Air and Radiation is to protect the public from the harmful effects of air pollution and prevent damage to the environment from releases of air contaminants. The bureau strives to achieve this mission through monitoring, permitting, planning, education, and compliance activities. These activities are conducted by four sections of the bureau and four local agencies. The bureau also carries out a comprehensive radiation protection program.

Air Construction Permit Section

Air Construction Permit Section staff receive and review construction permit applications for emissions sources to ensure that they minimize the release of air contaminants and meet all requirements. The applications range from approvals in cases where proposed emissions are relatively small to Prevention of Significant Deterioration (PSD) permits where facilities with substantial emissions are being constructed or modified. The Unified Government Health Department assists in the permitting process by issuing construction and operating permits in Wyandotte county.

Air Operating Permits and Compliance Section

The section processes operating permit applications for facilities requiring either Class I or Class II operating permits. Class I operating permits combine all applicable air quality requirements in one permit to clarify for both the facility and the public what is required to comply with the air pollution regulations. Section staff also use a combination of education, technical assistance and formal enforcement actions to ensure facilities subject to the air quality regulations comply with applicable requirements. Staff from KDHE's district offices and the four local agencies conduct inspections and forward the results to the compliance section for review and response. When a source violates an air quality requirement, the staff works with the facility to correct the problem or, in severe cases, takes formal enforcement action.

Monitoring, Inventory, and Modeling Section

The Air Monitoring Section staff work with three local agencies to operate an air monitoring network that provides air quality data from 25 sites around the state. The data are analyzed to determine compliance with federal standards and to evaluate air quality trends. Staff members also conduct an annual inventory of pollutants emitted from permitted facilities and other sources for the entire state. The section also utilizes monitoring and emission inventory information to conduct air quality modeling to evaluate the effectiveness of air pollution control strategies in areas such as the Kansas City metropolitan area.

Radiation, Asbestos, and Right-to-Know Section

The Radiation Control Program includes two program areas. The environmental radiation surveillance program has the purpose of detecting, identifying, and measuring any radioactive material released to the environment resulting from the operation of Wolf Creek Generating Station. The radioactive materials and X-Ray control program regulates the use of ionizing radiation in Kansas. The asbestos program in this section monitors the removal of asbestos from building renovation and demolition projects and issues licenses to asbestos workers to ensure trained personnel conduct removal activities. The Right-to-Know program receives information regarding chemical storage and releases.

Agencies

Environmental Protection Agency
Region 7
901 North 5th Street
Kansas City, Kansas 66101
www.epa.gov/region7/

Johnson County Environmental Department
Pollution Control Division
Southlake Tech. Center Building #4
11180 Thompson Avenue
Lenexa, Kansas 66219

Kansas Dept. of Health and Environment
Division of Environment
Bureau of Air and Radiation
1000 SW Jackson, Suite 310
Topeka, Kansas 66612-1366
www.kdhe.state.ks.us/bar

Mid-America Regional Council (MARC)
600 Broadway, 300 Rivergate Center
Kansas City, MO 64105
www.marc.org/

Shawnee County Health Agency
1615 West 8th Street
Topeka, Kansas 66606

Unified Govt. of Wyandotte County-KC, Kansas
Health Dept.
619 Ann
Kansas City, Kansas 66101
www.toto.net/daq

Wichita Department of Environmental Health
1900 East 9th Street
Wichita, Kansas 67214
http://www.wichitaenvironment.org/

We wish to gratefully acknowledge the assistance of all KDHE and local agency staff whose hard work made production of this report possible.

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